



# Server Features

Servers are used to give multiple people access to the same data or resources. Servers can be souped-up PCs, specialized super servers, midrange systems, even mainframes, but they all have similar requirements and features that are important to their proper operation.

## What Is Important In A Server

Absolutely, positively, a server must have these attributes in order to function in today's corporate environment: Servers must have Superior Reliability, be Highly Available and Scaleable. Businesses have become more reliant on servers as a “given” for doing business. This reliance has caused most of the server functions to become “mission critical.” Business can add up the hours of productivity lost when a given server is down, and translate that to real money that comes from the bottom line.

### **Reliability**

Reliability is the attribute of being dependable and consistent. Data integrity and the ability to warn of an impending hardware failure before it happens are two aspects of reliability.

Redundant power supplies and fans, predictive failure for hard drives and fans, and RAID (Redundant Array Of Independent Disks) systems are examples of common reliability features.

## **High Availability**

High Availability refers to the attribute of being present (“up”) and ready for immediate use. That can refer to the system itself, or the ability of a user to access what they need in real time. The ability to quickly recover from a system failure is also a key aspect of high availability. Highly available systems may or may not use redundant components but they should have the ability to perform hot swap key components. Hot swapping refers to the ability to pull out a failed component and plug in a new one while the power is still on and the system is operating.

An example of high availability is the ability to detect a potential failure and transparently redirect or “failover” processes to other areas or systems. For example: Some SCSI drives can automatically move data from sectors that are hard to read to spare sectors without the operating system or the user being aware of the change.

## **Scalability**

Scalability refers to the ability to increase the capacity of a server (within reason). Whatever capacity a server has initially, you can be assured that it will quickly be filled. As more users are brought on-line and transaction volume increases, the server will eventually require upgrading.

Scalability considerations include:

- Ability to add memory
- Ability to add processors
- Ability to add disk storage
- Limitations of the operating system

## **Dedicated Servers**

Servers have many different uses in a client/server system but almost all will fall into four main categories: File Servers, Print Servers, Database Servers, and Application Servers. Another category of server is the Inter/Intranet server which is a hybrid of these types of servers.

## **File Servers**

File servers provide centralized disk storage that can be shared by client computers on a network. They are commonly used to store programs and data files. Often the server does no processing of the data; it simply acts as an input and output source for data, essentially a remote disk drive. Technically this would not qualify the system as "client/server" since in a true client /server environment both the server and the client share the processing workload.

A primary task of file servers is to ensure that two users do not try to update the same file at the same time. They do this by locking a file while a user performs the update, so that no other user can access the file until the first user is finished. For documentation files the whole document is usually locked. With database files individual sections or rows may be locked instead of restricting access to the entire table.

## **Print Servers**

One of the main reasons small businesses install a network is to share expensive printers. In some cases a computer is dedicated as a print server whose sole purpose is to manage the printing requests in an orderly fashion.

Sometimes a computer may do double duty as both a print server and a file server with some drop in performance. Other resources may also be shared such as modems, fax devices and CD-ROM drives.

## **Database Servers**

A database server is a server that runs an SQL-based database management system (DBMS). Client computers send the SQL requests to the database server, which accesses the stored database to process the request and returns the results to the client computer. When referring to a database server, the word "server" may refer to the computer itself or the DBMS software that manages the database as in "Microsoft SQL Server."

## **Application Servers**

Just as it sounds, the application server is a server that actually runs the application. An example of an application server is a mail server.

Applications are put on a server as opposed to a client system when:

- The application is too process intensive for the client.
- The application requires business logic that should not be replicated throughout the enterprise.
- A centralized method of accessing and updating data is required.

## **Inter/Intranet Server**

As the Internet grows, the number of servers used to host the data for external or internal web sites is increasing dramatically. These servers are sometimes used as database servers, often are file servers, and most are application servers of some sort.

## **Server Operating Systems**

Operating systems can help or hinder a server in its ability to properly perform its duties. Key considerations when selecting a server operating system include:

- Compatibility with existing systems (software, hardware, and network).
- Ease of configuration and maintenance.
- Scalability (number of processors it supports, amount of memory it can access, etc.).
- Number of concurrent users it will support.

## **UNIX\***

UNIX originally began as a time-sharing operating system for minicomputers but has become one of the most popular server operating systems in client/server environments. UNIX was developed in 1969 by AT&T\* and was written in the "C" programming language, which was also developed by AT&T. Because "C" compilers became available for many different platforms, UNIX was ported to a wider variety of machines than any other operating system.

Unlike other operating systems, UNIX is sold in different variations by several vendors. There is no one true UNIX. Instead, there are many different versions that are similar but incompatible, although there have been many attempts at creating one UNIX standard.

Some UNIX software versions are:

<b><i>Vendor</i></b>	<b><i>UNIX</i></b>
<b><i>Sun Microsystems*</i></b>	Solaris*
<b><i>SCO* (Santa Cruz Operations)</i></b>	SCO UNIX
<b><i>IBM*</i></b>	AIX*
<b><i>Novell*</i></b>	UnixWare*
<b><i>Digital*</i></b>	OSF/1*
<b><i>Hewlett-Packard*</i></b>	HP/UX*

## **Windows\* NT Server**

Originally to be named OS/2\* Version 3.0 (in a joint venture between Microsoft\* and IBM), this operating system was renamed Windows NT and introduced in 1993. Windows NT is a 32-bit operating system from Microsoft. It does not use DOS (Disk Operating System) and is a self-contained operating system. NT is part of the Microsoft BackOffice\* suite of products designed for client/server computing. If you want an all Microsoft client/server solution, this is the operating system of choice.

The latest version of NT, 4.0, was introduced in the summer of 1996. It utilizes the Windows 95 interface but there are differences between the dialog boxes and features which the two support. NT includes Microsoft's DCOM interface that allows applications to be distributed across the network. It does not support Plug and Play, as does Windows 95.

## **NetWare\***

NetWare is a family of network operating systems from Novell\*. It supports DOS, Windows, OS/2 and Mac clients. UNIX client support is available from third parties. A NetWare 4.X server can support up to 1000 concurrent users, includes real-time disk compression, and symmetrical multiprocessing support for up to 32 processors.

## **Server Platforms**

When looking at the various server platforms we need to remember that there is no one universal platform for large organizations (regardless of the CIOs' desire to find one or the claims of vendors to have one). And while information technology professionals need to understand the key characteristics that distinguish server platforms from each other, they should base their server platform decisions on the value that they attribute to these distinguishing characteristics rather than on cost or performance claims.

Some of the criteria for selecting the proper platform in a business and decision support environment include complex processing power, the number of active users supported, amount of storage, availability, reliability, data integrity, security, and disaster recovery,

## **Entry Level Servers**

The simplest computer choice is the Entry Level Server. It is relatively inexpensive and is readily available from a variety of vendors and mail order companies. Entry level servers are the easiest to install and operate. They are ideal for small networks. They also are the least scaleable.

The following should be carefully considered when configuring an entry-level server:

Processor - Generally speaking you should get the fastest processor you can afford. Be sure that you have enough processing power to satisfy the minimum requirement for the software that your server will be running.

Memory - Get as much as possible. Most servers at this level will have the ability to handle 128 MB.

Expansion Bus - The expansion bus is a row of slots into which peripheral devices can be attached. A high-speed bus such as PCI is desirable. Try to ensure that you have as many slots as possible so as not to limit the number of boards which can be inserted into the bus.

Disk Drives - Most desktop computers use inexpensive disks called IDE drives. These are fine for individual use but are not adequate for a server. Instead most entry-level servers will use SCSI drives for their improved performance and scalability. RAID Disk subsystems can also be used though they are usually mounted in a separate case.

Power Supply and Chassis - All servers should come in oversized chassis that have plenty of room for expansion. Make sure you have enough drive bays to handle additional disk drives, CD-ROM drives, and data backup systems. Also make sure the power supply is adequate, usually 300 watts is typical.

## **Midrange Servers**

Advantages of midrange servers over entry-level servers includes fault tolerant features and expanded reliability, availability and scalability. In addition to their capacity for more memory and disk storage, they also have the ability to handle multiple processors. Midrange servers typically employ RAID subsystems and high-speed I/O subsystems for optimizing performance.

Because a larger server can take the place of multiple smaller servers, a tradeoff is presented as to whether to buy many small servers or fewer large servers. On the one hand, consolidated servers pose more of a possibility of the entire network going down or business function being unavailable should the server fail. The counter is that the larger servers are loaded with more reliability, high availability and management features so it is much less likely that the server will go down. The maintenance on fewer larger servers is much easier to perform and is less expensive than the maintenance on more smaller servers.

## **Mainframe**

Another option is to use a mainframe as a server. Mainframes are specialized machines which excel at storing very large databases needing very large amounts of memory and disk space. One downside to the mainframe is cost. Not only is it more expensive to purchase, but the software required to run it is often proprietary and the staffing requirements are greater to maintain it. Most businesses that have mainframes also have dedicated servers. A mainframe probably does not make sense for most small business or networks, and even mid-sized businesses may want to take a look at just using servers rather than trying to make a mainframe server do double duty.

## Key Points to Remember

- Three attributes servers should have are reliability, availability, and scalability.
- Four common types of servers are file, print, database and application servers.
- Important considerations when selecting a server operating system are its compatibility, ease of configuration and maintenance, ability to scale, and number of users it will support.
- Key components of all servers are the processors, memory, bus, disk drives, power supply and chassis.